AMENDMENTS TO THE CLAIMS

Please amend the claims as shown below.

Claim 1. (Eight times amended) A mutant prenyl diphosphate synthase having [a modified] an amino acid sequence modified from the amino acid sequence[,] of SEQ ID NO:1 by only:

replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81;

replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81;

replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81;

replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81; or

replacing phenylalanine with tyrosine at position 77, replacing threonine with serine at position 78, replacing valine with isoleucine at position 80, replacing isoleucine with leucine at position 84 and inserting proline and serine sequentially between position 84 and position 85

[wherein

said mutant prenyl diphosphate synthase comprises an aspartic acid-rich domain having the sequence, $D_1D_2X_1X_2(X_3X_4)D_3$, in region II of said mutant prenyl diphosphate synthase

wherein each of D_1, D_2, and D_3 denote an aspartic acid residue; X_1, X_2 , X_3, and X_4 are each independently any amino acid and X_3 and X_4 are each optionally independently present in the aspartic acid rich domain,

and wherein said mutant prenyl diphosphate synthase comprises (1) at least one amino acid substitution, said at least one amino acid substitution located at at least one amino acid position selected from (a) an amino acid between D_1 and the amino acid residue at the fifth position upstream of D_1 and (b) the amino acid residue located one amino acid position upstream of D_3; (2) at least one additional amino acid inserted between D_3 and the first amino acid upstream of D_3; or a combination of (2) (1) and (3) (2);

wherein said mutant prenyl diphosphate synthase synthesizes prenyl diphosphate which is shorter than prenyl diphosphate synthesized by a corresponding wild-type enzyme].

Claim 2. (Five times amended) A mutant prenyl diphosphate synthase according to claim 1 wherein said mutant has [the enzymatic activities and] thermostability almost equal to that of the wild type prenyl diphosphate synthase and synthesizes more farnesyl diphosphate than the amount of farnesyl diphosphate synthesized by the wild type prenyl diphosphate synthase under identical conditions.

Claim 3. (Two Times Amended) A mutant [enzyme] prenyl diphosphate synthase according to claim 1 wherein [the] a reaction product of the mutant prenyl diphosphate synthase is farnesyl diphosphate.

Claim 4. (Two Times Amended) A mutant [enzyme] prenyl diphosphate synthase according to claim 1 wherein the mutant prenyl diphosphate synthase is [of the homodimer-type] a homodimer.

Claim 5. (Canceled)

Claim 6. (Three Times Amended) A mutant [enzyme] prenyl diphosphate synthase according to claim 1 wherein the mutant prenyl diphosphate synthase is [derived from] a mutant of a *Sulfolobus acidocaldarius* prenyl diphosphate synthase.

Claim 7. (Three Times Amended) A mutant [enzyme] prenyl diphosphate synthase according to claim 1 [wherein the prenyl diphosphate synthase is a thermostable] having a higher enzymatic activity using isopentenyl diphosphate as a substrate at a temperature of 80 °C and under identical conditions than that of the wild-type prenyl diphosphate synthase [enzyme].

Claims 8-10. (Canceled).

Claim 11. (Original) A DNA encoding an enzyme according to claim 1.

Claim 12. (Original) An RNA transcribed from a DNA according to claim 11.

Claim 13. (Original) A recombinant vector comprising a DNA according to claim 11.

Claim 14. (Amended) [A] An isolated host organism transformed with a recombinant vector according to claim 13.

Claim 15. (Two Times Amended) A process for producing a mutant [enzyme] prenyl diphosphate synthase according to claim 1, said method comprising the steps of culturing a host transformed with an expression vector comprising a DNA coding for the mutant [enzyme] prenyl diphosphate synthase and [of] harvesting the expression product from the culture.

Claim 16. (Two Times Amended) A process for producing a prenyl diphosphate having not more than 15 carbons comprising the step of bringing an enzyme according to [claim] any one of claims 1 [or any of claims 2] to 4, 6 and 7 [10] or an enzyme produced by the method according to claim 15 into contact with a substrate selected from the group consisting of isopentenyl diphosphate, dimethylallyl diphosphate, and geranyl diphosphate.

Claims 17-48. (Canceled).

Claim 49. The mutant prenyl diphosphate synthase of claim 1, wherein the amino acid sequence of SEQ ID NO:1 is modified by only replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81.

Claim 50. The mutant prenyl diphosphate synthase of claim 1, wherein the amino acid sequence of SEQ ID NO:1 is modified by only replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81.

Claim 51. The mutant prenyl diphosphate synthase of claim 1, wherein the amino acid sequence of SEQ ID NO:1 is modified by only replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with leucine at position 81.

Claim 52. The mutant prenyl diphosphate synthase of claim 1, wherein the amino acid sequence of SEQ ID NO:1 is modified by only replacing phenylalanine with tyrosine at position 77, replacing threonine with phenylalanine at position 78 and replacing histidine with alanine at position 81.

Claim 53. The mutant prenyl diphosphate synthase of claim 1, wherein the amino acid sequence of SEQ ID NO:1 is modified by only replacing phenylalanine with tyrosine at position 77, replacing threonine with serine at position 78, replacing valine with isoleucine at position 80, replacing isoleucine with leucine at position 84 and inserting proline and serine sequentially between position 84 and position 85.